Breeding durable eucalypts

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CHRISTCHURCH NEW ZEALAND

NZDFI NEW ZEALAND DRYLAND FORESTS INITIATIVE
breeding tomorrow's trees today

Where are we?

Madrid

Barcelona

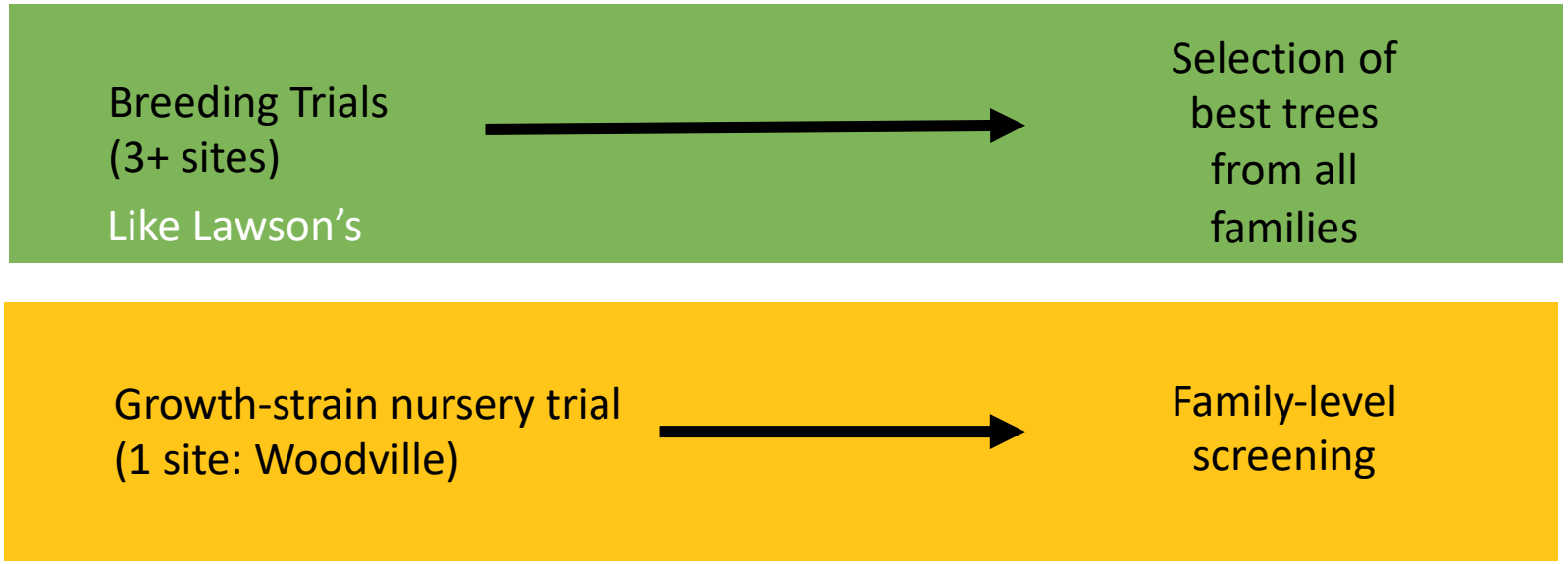
Montpellier

Motivation

Demonstration trial
(photo: Rick Alexander)


It can get fairly dry at times…

How is our breeding programme structured (for **each of 5** species)?

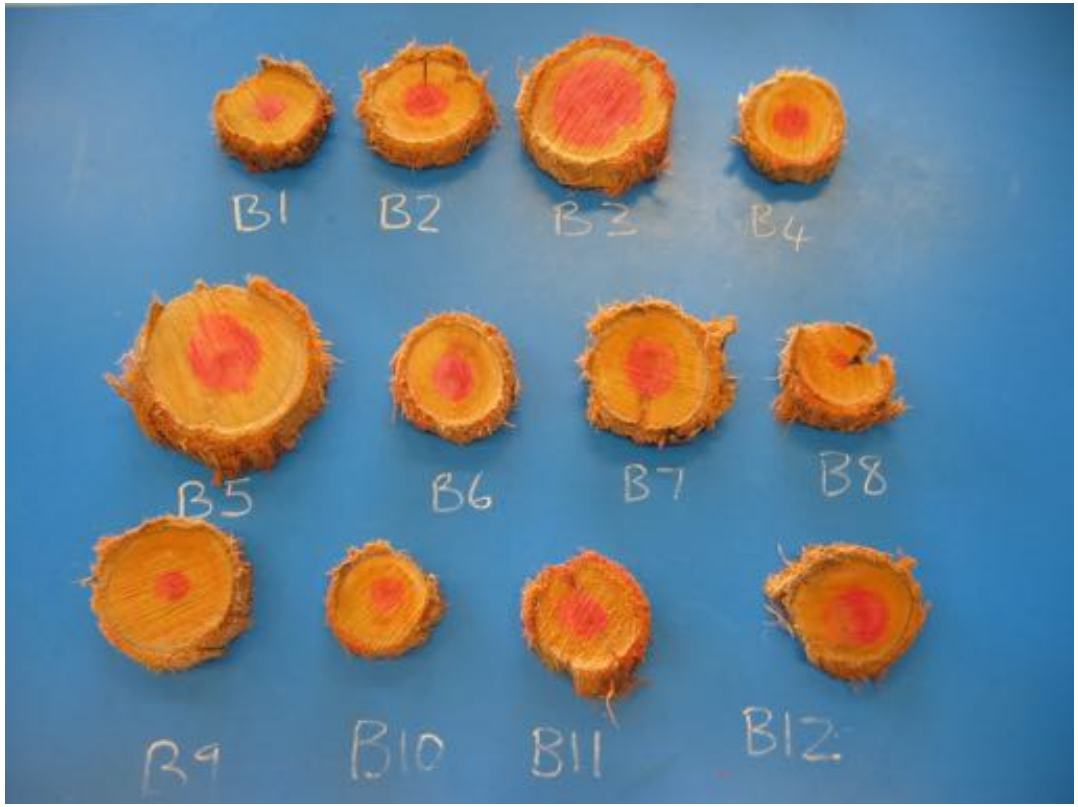


Selections

Based on individual tree assessment
+
family-level assessments


Lawson's Progeny Trial (*E. bosistoana*)

Durability (using 3 criteria)



Heartwood variability ➤ Durability variability

Heartwood presence/absence

Heartwood quantity

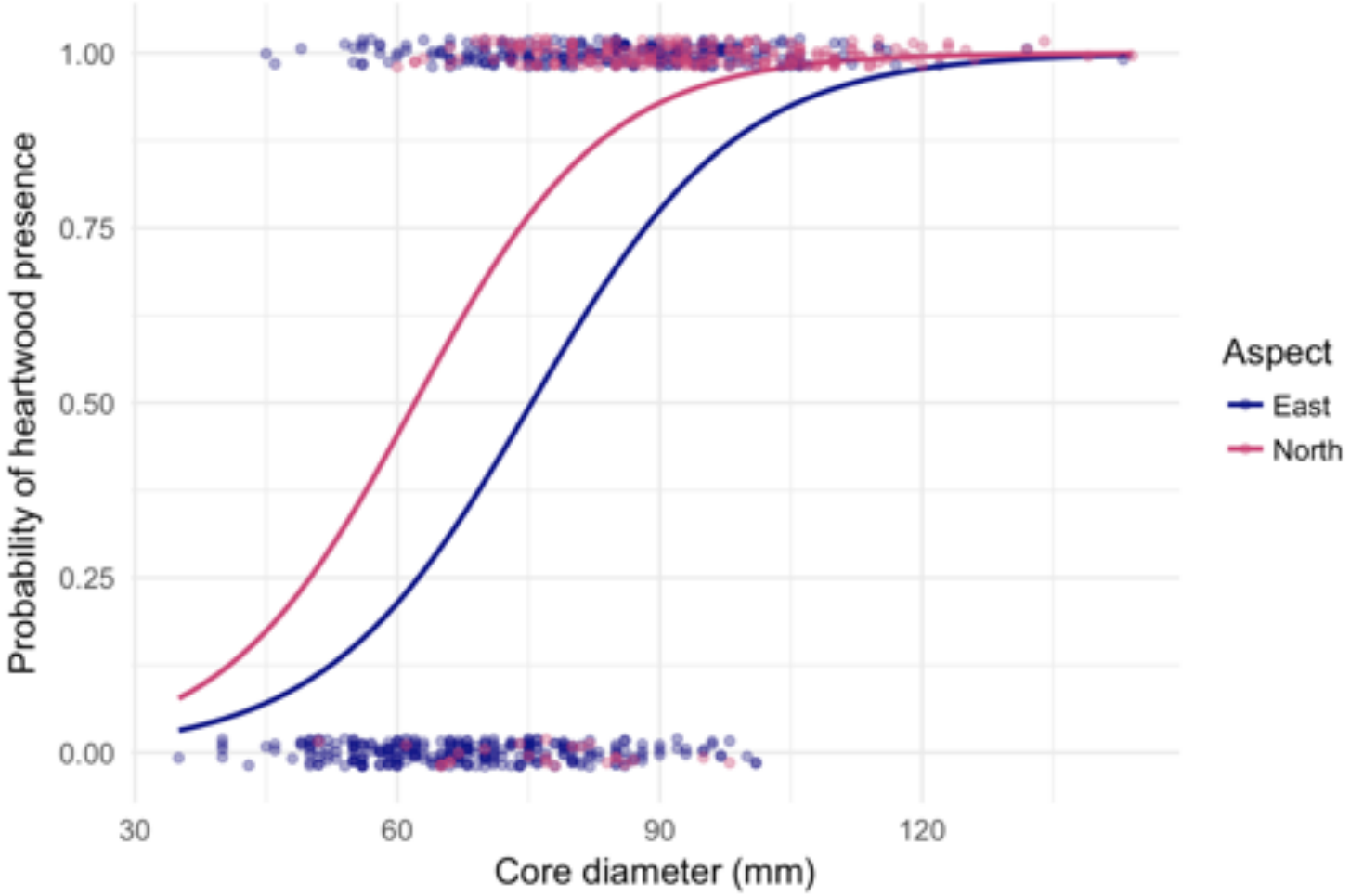
Heartwood quality (extractives content via NIR)

Heartwood quality (mass loss for brown & white rot via NIR)

Li, Apiolaza & Altaner. 2018. Genetic variation in heartwood properties and growth traits of *Eucalyptus bosistoana*. European Journal of Forest Research 137:565–572.

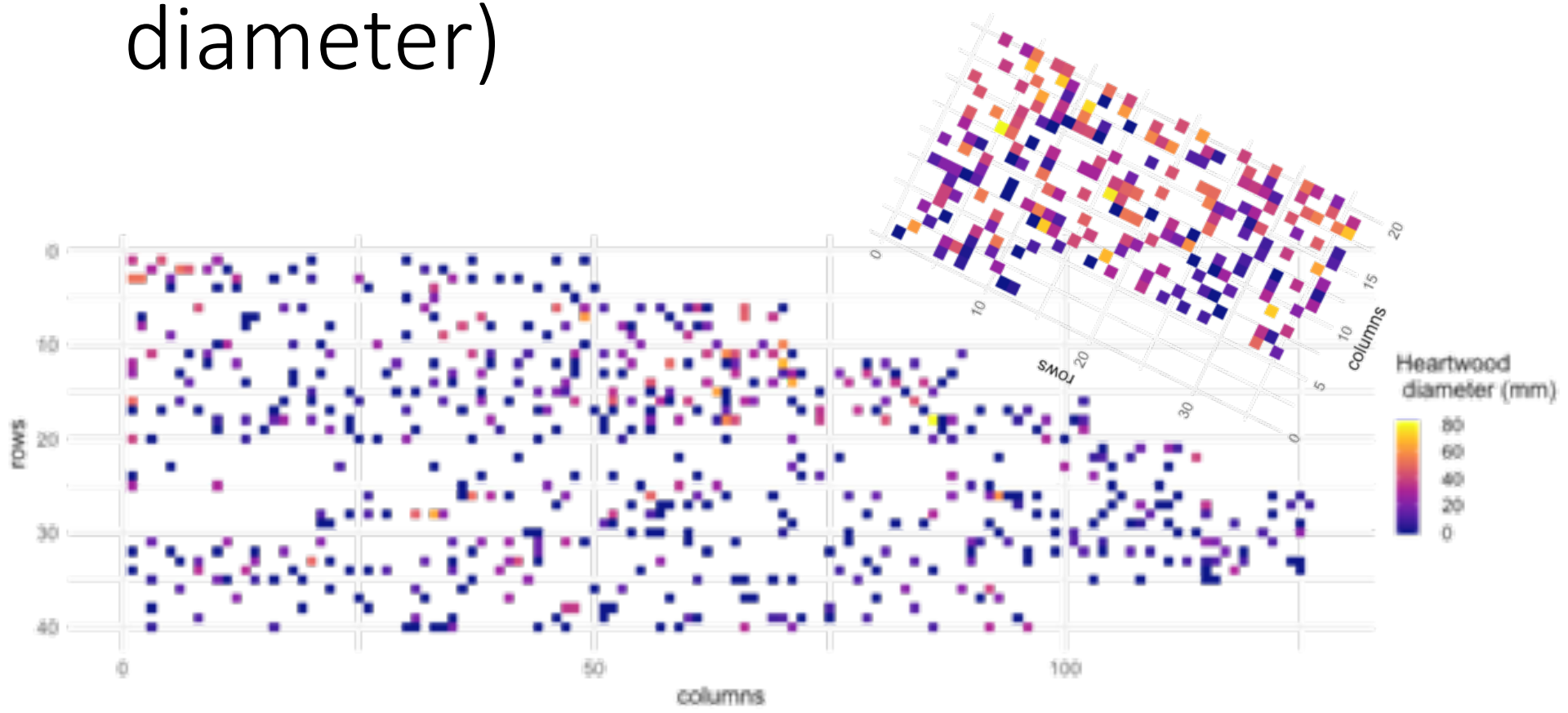

B14-78
B143-55
B42-22

Environmental effects on heartwood presence/absence



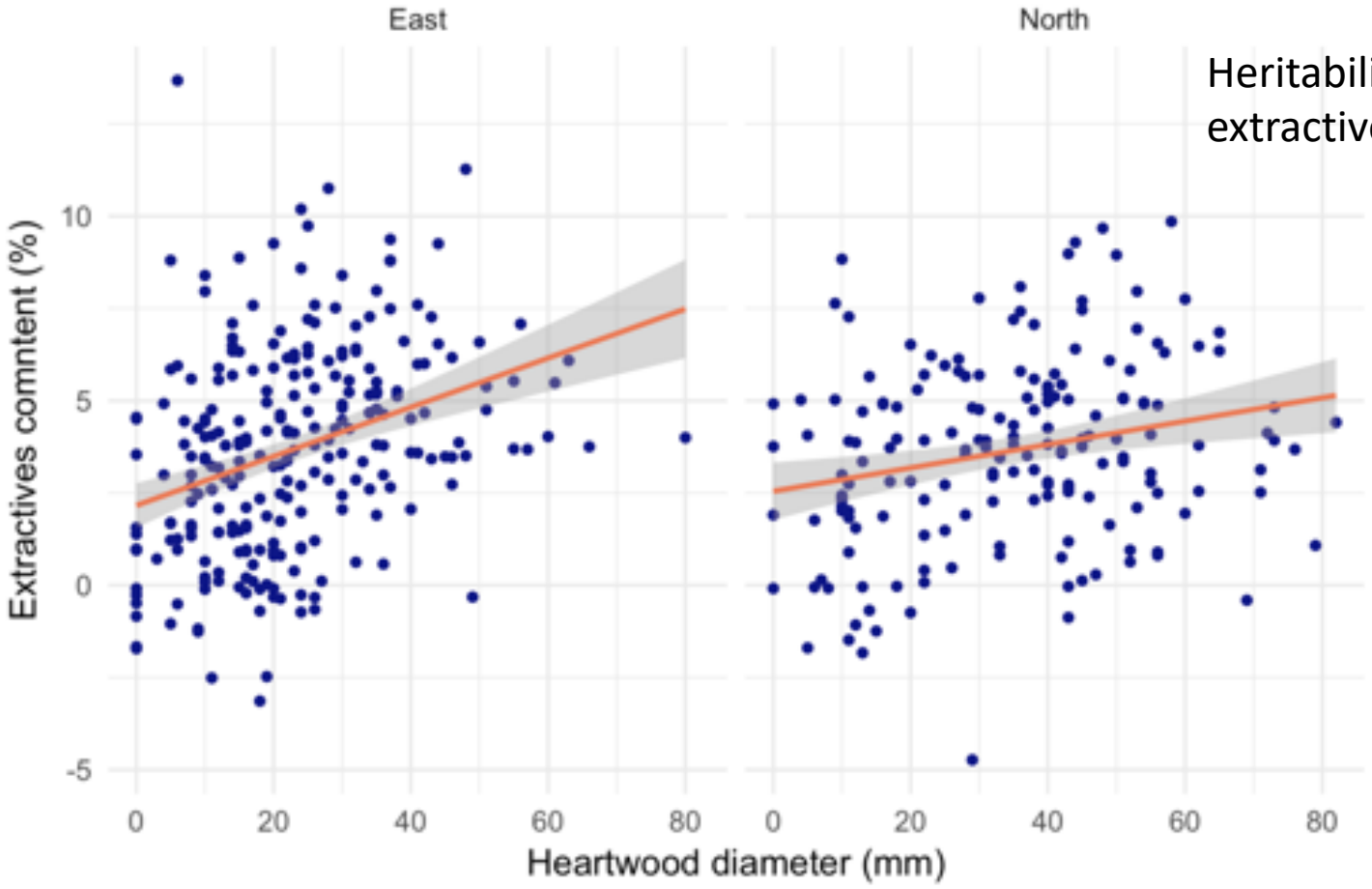
Heritability for heartwood presence ~ 0.2—0.3

Heartwood quantity (heart diameter)



Heritability for heartwood diameter ~ 0.4—0.5

Relationship between the durability criteria



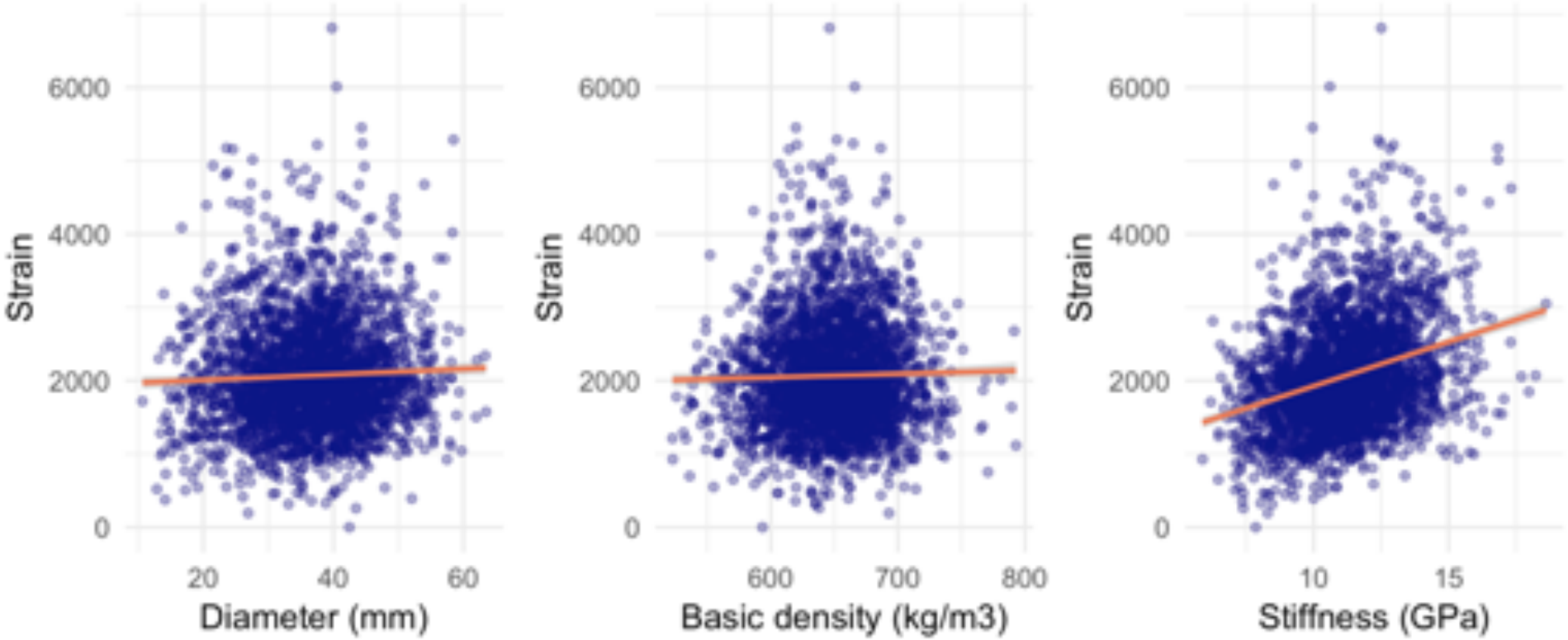
Heritability for predicted extractive contents ~ 0.3—0.6

Growth strain: nursery trial

Larger opening ➤ Higher growth strain

Chauhan & Entwistle. 2010. Measurement of surface growth stress in *Eucalyptus nitens* Maiden by splitting a log along its axis. Holzforschung, 64(2). DOI:10.1515/hf.2010.022
Davies, Apiolaza & Sharma. 2017 Heritability of growth strain in *Eucalyptus bosistoana*: a Bayesian approach with left-censored data. New Zealand Journal of Forestry Science 47:5 DOI: 10.1186/s40490-017-0086-

Growth strain: some results



Growth strain heritability ~ 0.3

Our most disappointing trait: right now the resolution is only enough to discriminate between best and worst families

In summary

- We are domesticating 5 species, focusing on the quality of solid-products.
- We assess early 2 to 7 years.
- We match trees to environments: niche products for niche sites.
- Durability split into three traits: 1/0, heartwood diameter and extractives content.
- Growth strain is much harder to deal with; right now can tell between best & worst families, but not at the tree level.

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SUPPORTERS: